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By- Hay, Kenneth M.; And Others

Eye Protection in Kansas Schools.

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A law passed by a state legislature requires that students in industrial arts shops and science laboratories must wear eye protective devices. Explanatory material presents the text of the bill and guidelines for implementation, including--(1) types of eye hazards, (2) types of protective devices, (3) administrating eye safety equipment, (4) financing and manufacturers, and (5) recommended eye protection for specific subject areas such as industrial arts, science, art, and technical-vocational education. A synopsis of the United States of America Standards Institute safety code for goggles, spectacles, and lenses is also provided. Drawings of safety spectacle types and monogoggles are included. (MM)

EYE PROTECTION IN KANSAS SCHOOLS

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Issued by:
KANSAS STATE DEPARTMENT OF PUBLIC INSTRUCTION
W. C. Kampschroeder, Superintendent

and
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prepared by:
Kenneth M. Hay, Area Vocational-Technical School Supervisor
Jan L. Holman, Science Consultant
Menno Stucky, Industrial Arts Consultant

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U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION

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FOREWORD

Kansas Senate Bill 152 was passed by the 1967 Kansas Legislature and signed into law by the governor. It provides that all educational institutions will assure that all students engaged in or proximal to activities in vocational-technical shops, industrial arts shops, and science laboratories shall wear eye protective devices which comply with the U. S. A. Standards Institute safety code Z 2.1-1959. The effective date is July 1, 1967.

This publication is directed to superintendents of public, private, and parochial schools; directors of area vocational-technical schools; president of Schilling Institute; and presidents of public community junior colleges. It has been prepared as a joint project by the State Department of Public Instruction and the State Board for Vocational Education. It is hoped that the information included in this publication will assist school officials to comply with the provisions of law as set out in Senate Bill 152.

W. C. Kampschroeder

W. C. Kampschroeder, Superintendent
State Department of Public Instruction

John E. Snyder

John E. Snyder, Director
State Board for Vocational Education

SENATE BILL NO. 152

AN ACT requiring all students and teachers to wear approved eye protection devices when participating in certain vocational, industrial arts, and chemical-physical courses or laboratories.

BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF KANSAS:

Every student and teacher in all schools, colleges, and universities or other educational institutions participating in any of the following courses:

(A) Vocational, technical or industrial arts shops or laboratories involving experience with:

1. Hot molten metals, or other molten materials;
2. Milling, sawing, turning, shaping, cutting, grinding, or stamping of any solid materials;
3. Heat treatment, tempering, or kiln firing of any metal or other materials;
4. Gas or electric arc welding, or other forms of welding processes;
5. Repair or servicing of any vehicle;
6. Caustic or explosive materials;

(B) Chemical or combined chemical-physical laboratories involving caustic or explosive chemicals or hot liquids or solids, or injurious radiations, or other hazards not enumerated; is required to wear appropriate industrial quality eye protective devices at all times while participating in such courses or laboratories. Such devices may be furnished for all students and teachers, and shall be furnished for all visitors to such classrooms and laboratories. Such devices may be purchased in large quantities and sold at cost to students and teachers.

"Industrial quality eye protective devices," as used in this section, means devices meeting the standards of the United States of America standard safety code for head, eye and respiratory protection, Z2 1-1959, promulgated by the United States of America Standards Institute, Incorporated.

This act shall take effect and be in force from and after its publication in the statute book.

NOTE: Because of frequent references in commercial catalogs to the American Standards Association (ASA), it is important to note that since August, 1966, the United States of America Standards Institute, Incorporated, has superceded the American Standards Association. All standards approved by the latter organization continue in effect under the United States of America Standards Institute designation.

GUIDELINES FOR THE IMPLEMENTATION OF SENATE BILL NO. 152

This section deals with the act requiring all students and instructors to wear approved eye protective devices when participating in certain vocational-technical, industrial arts, and chemical-physical courses or laboratories, as interpreted by the staff of the State Department of Public Instruction and the State Board for Vocational Education.

The eye safety program stipulated by Senate Bill #152 mandate that compliance and enforcement of this legislation are part of the instructional responsibilities of each educational institution in Kansas.

It is the responsibility of the administration of each educational institution to assure compliance with this law. Regular orientation meetings should be held at least annually with the entire staff to fully explain the program and assign responsibilities for its implementation.

An administrator and a school staff safety officer should conduct an inspection several times during the school year to determine compliance with the law. Infractions should be immediately corrected.

Each science, industrial arts, and vocational-technical education staff member has the responsibility to assure that those persons in his area, whether visitors, students, faculty, or other wear the proper eye protective devices.

Faculty members should fully analyze the eye hazards involved in activities for which they are responsible and explain to students the need for the type of eye protection specified in their work.

TYPES OF EYE HAZARDS

Because there are so many different types of eye hazards, safety eyewear takes a variety of forms. Among these hazards are:

1. Dusts and powders - this type of eye hazard requires a face-fitting goggle.
2. Chemicals, chemical vapors and solutions - these hazards are found in spraying, dipping, plating operations, cleaning, science laboratory exercises or any situation involving volatile chemicals that give off vapors or fumes. This requires a full monogoggle which provides a tight seal to the face and made of materials resistant to chemical action.
3. Glare and Radiation - some sources of glare and radiation are welding and cutting torches (oxy-acetylene and electric arc), molten metals, furnaces, certain electricity/electronic equipment and certain chemical oxidations. There are many types of filters designed for specific situations. Caution must be exercised to make sure that the filter selected is right for the job.
4. Impact - this is an item of great concern since it is a hazard in almost all shop activities and can be of concern in chemical laboratories. Since, hazards usually happen quickly and unexpectedly without warning, all students in an area are potential victims even though they are not involved in the operation causing the source of the flying object. Explosions of chemicals in glass containers are typical sources of impact particles.

TYPES OF EYE PROTECTIVE DEVICES

Basically there are three types of eye protection: the spectacle type, monogoggle, and the face shield. Each has many styles.

THE SPECTACLE

The spectacle may be fitted with either glass or plastic lenses. The glass lenses provide superior visual acuity and they are more scratch resistant and therefore will outlast plastic lenses. Spectacles may be obtained with a universal saddle bridge or a specific bridge size. There is some preference for specific bridge sizes for student use because of better comfort for the wearer. Common types of temples are the spatula, and the bow cable. Cable temples are recommended in shops where considerable physical activity is involved. In instances where spatula temples are desired, elastic head bands could be attached if difficulty is encountered in keeping spectacles in proper position.

Spectacles provide inadequate splash protection, inadequate protection against fumes, and generally cannot be used with prescription glasses, but may be used with contact lenses.

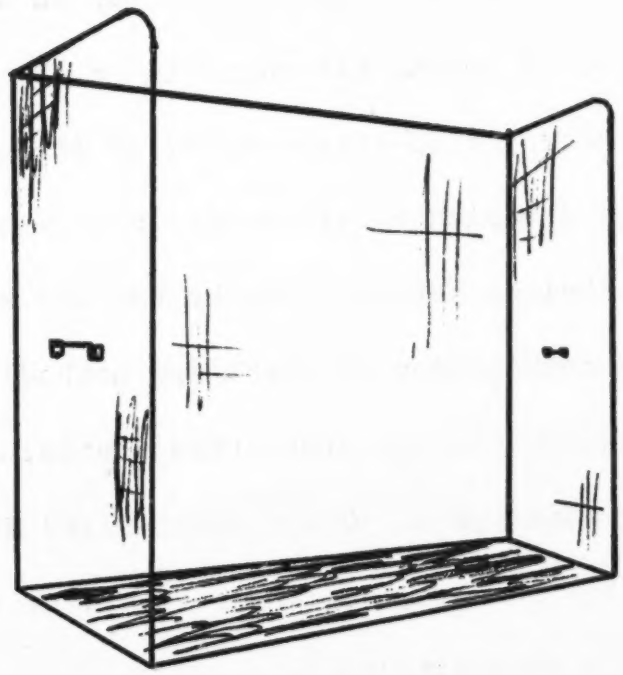
THE MONOGOGGLE

The monogoggle may be worn with prescription glasses, provide impact protection, provide splash protection, gives adequate dust protection in most school situations, and has considerable fume protection. Side vision is restricted on some models, ventilation is limited, cleaning and drying is difficult after sterilizing, and storage requires considerable space.

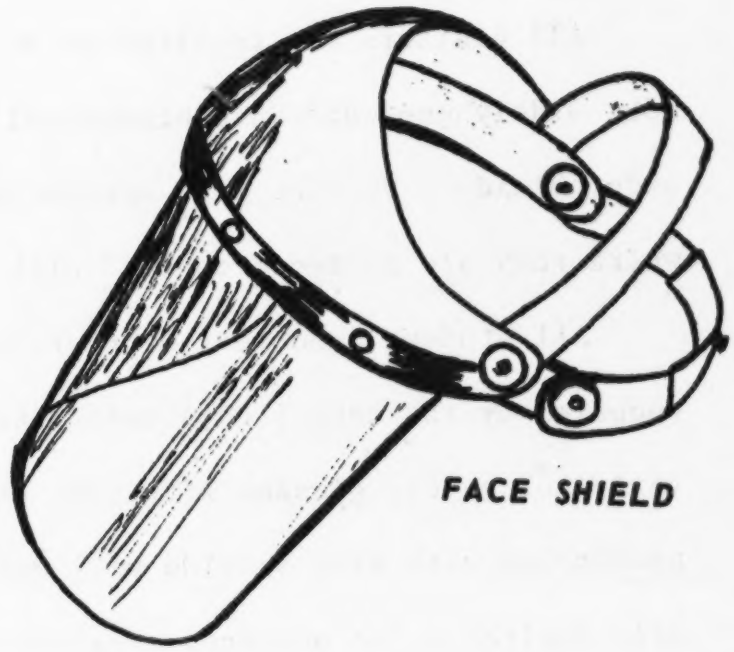
THE FACE SHIELD

The face shield may be worn with prescription glasses. It provides minor impact protection, protects head and face as well as eyes. There is inadequate splash protection, little protection against fumes, there is a large surface area to sterilize and clean, and a large storage area is required.

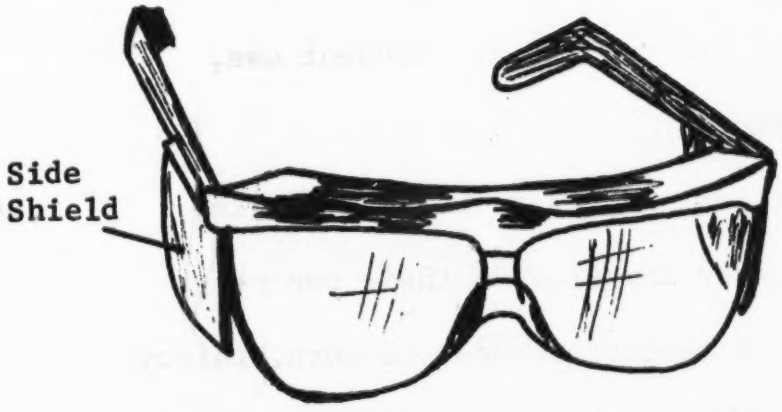
EYE PROTECTIVE DEVICES



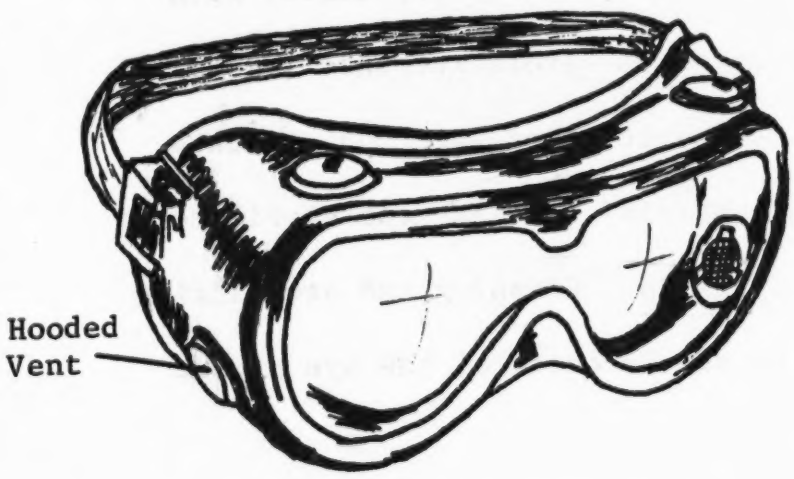
DEMONSTRATION
SAFETY SHIELD



FACE SHIELD



VISITOR SAFETY SPECTACLES
WITH SIDE SHIELDS



MONOGOGGLE WITH HOODED VENTS

SAFETY SPECTACLE WITH
SIDE SHIELDS

ADMINISTRATING EYE SAFETY EQUIPMENT

Eye safety equipment is generally provided in one of two ways. One is by assigning each student a basic eye protection device to wear in all classes where eye protection is necessary. A second procedure is to maintain a class set of protective devices to be used period-after-period by different students. This procedure, however, presents a health hazard unless provision is made for sterilization of the protective devices between uses by various students. Probably the most desirable is a combination of these two methods whereby students either purchase or rent their basic eye protective device, usually a spectacle with side shields or a monogoggle. Other specialized devices not required at all times, such as face shields, welding goggles, or arc welding helmets, are usually provided on a community basis.

All visitors are required to wear approved eye protective devices. The most widely used and most economical is the plastic visitors spectacle with side shields. Visitor type spectacles are not recommended for student use, where they are in close contact with eye hazards.

All students who wear corrective glasses must wear a safety monogoggle, supplied by the school on a rental basis, or they may provide their own prescription safety glasses with side shields. If contact lenses are worn, safety spectacles with side shields will meet requirements. Monogoggles are certainly more desirable for science. Regardless of the brand or specific device selected, the success of an eye protection program depends on proper fit, especially with safety spectacles. Therefore, compare brands and sizes before purchase. Most oculists and optometrists will be happy to fit the spectacles for your students.

The school shall provide the equipment and material to clean and sterilize between each use all devices used on a community basis. Cleaning and sterilizing equipment and materials may be obtained from the manufacturer of the eye protection devices purchased.

FINANCING

Financing policies and problems vary with schools. Some schools are procuring eye protectors and assigning them to pupils and teacher at no cost. Some buy the eye protectors and issue them to students on a rental basis as they do textbooks. Others find it desirable to buy eye protectors and resell them to the students to recover their investment.

Students needing prescription safety glasses will usually be required to assume the cost of their spectacles.

All students should be encouraged to purchase their own eye protective devices. This provides for the possibility of a proper fit which is very essential if eye protection is to be worn at all times as required by this law. A student may be given the option of purchasing eye protection through the school or through another source. However, the school, for their protection, must require that all eye protection used in the classes must meet the USA Standards Institute safety code Z2.1-1959. This is usually accomplished with a certification form filled out by the qualified practitioner.

If a student is not able to purchase his own eye safety equipment it is the responsibility of the school to purchase such equipment and to rent or loan this to the student.

MANUFACTURERS OF EYE PROTECTIVE DEVICES

An alphabetical listing of eye protective device manufacturers is placed here to assist you in obtaining satisfactory devices. This is not an all inclusive listing, but it is representative of reputable companies whose products meet the minimum standards of the United States of America standard safety code for head, eye, and respiratory protection, Z2.1-1959.

American Industrial Safety Equipment Company
3535 Lakeside Avenue
Cleveland, Ohio 44114

American Optical Company
Safety Products Division
5405 Milton Parkway
Rosemont, Illinois 60018

Bausch and Lomb
2727 Oak
Kansas City, Missouri 64108

Cesco Safety Products Incorporated
2727 West Roscoe Street
Chicago, Illinois 60618

Fendall Company
2222 Diversey Parkway
Chicago, Illinois 60647

General Scientific Equipment Company
Williams Street and Linekiln Road
Philadelphia, Pennsylvania 19150

Glendale Optical Company, Incorporated
130 Crossways Park Drive
Woodbury, Long Island, New York

Sellstrom Manufacturing Company
Palatine, Illinois 60067

United States Safety Service Company
1535 Walnut Street
Kansas City, Missouri 64108

RECOMMENDED EYE PROTECTION FOR SPECIFIC SUBJECT AREAS

INDUSTRIAL ARTS

General Industrial Arts (General Shop)

This program consists of multiple activities provided in one shop. Eye protection shall be worn by all students while any activity which may cause danger to the eyes is occuring in that room. The most desirable type is a safety spectacle with side shields. Additional eye protection may be required in special areas depending on course content.

Ceramics

Safety spectacles with side shields shall be worn while any activity which may constitute a danger to the eyes is in progress in the room.

Drafting

Eye protection is not required for students working in a separate drafting room. However, the wearing of safety spectacles with side shields shall be required if drafting is done within a shop area where any potentially dangerous activities are in progress.

Electricity/Electronics

Safety spectacles with side shields shall be worn while any activity which may constitute a danger to the eyes is in progress in the room.

Graphic Arts

Safety spectacles with side shields shall be worn while any activity which may constitute a danger to the eyes is in progress in the room.

Plastics

Safety spectacles with side shields shall be worn while any activity which may constitute a danger to the eyes is in progress in the room. Monogoggles with hooded vents shall be worn in addition while the instructor or students are working with hazardous chemicals.

Power Mechanics and Auto Mechanics

Safety spectacles with side shields shall be worn while any activity which may constitute a danger to the eyes is in progress in the room. In addition,

welding goggles, an arc welding helmet, a face shield, or chemical goggles may be required.

Metals

Safety spectacles with side shields shall be worn while any activity which may constitute a danger to the eyes is in progress in the room. In addition, welding goggles or a welding helmet shall be worn by welders for proper protection in welding. A face shield or chemical goggles are necessary when heating and pouring metal and for some specific grinding and machining operations.

Woods

Safety spectacles with side shields shall be worn while any activity which may constitute a danger to the eyes is in progress in the room. A face shield may also be required for special operations.

Welding

Safety spectacles with side shields shall be worn under the welding helmet. These may have clear or filtered lenses in the electric arc welding processes. The side shields must prevent the passage of harmful light rays from other welding operators while the helmet is in the raised position.

For further information concerning industrial arts contact the
Industrial Arts Consultant
State Department of Public Instruction
Topeka, Kansas
Telephone - CEntral 5-0011, extension 8194

SCIENCE

Elementary Demonstration - A safety shield may be used in operations involving possible explosion, spattering of potentially harmful chemicals, or flying particles. The instructor shall be wearing individual eye spectacles with side shields or monogoggles.

Elementary Student Activity - Activity is the most vital aspect of elementary science and should not be curtailed in any respect as a result of the law. During activity oriented exercises eye spectacles with side shields or monogoggles should be used when corrosive or possibly explosive chemicals are used, or when activities could produce flying wood or metal chips or splinters.

Junior High School Science - During any exercise involving possible explosions, possible spattering of potentially harmful chemicals, or possible flying particles in any part of the laboratory all students and instructor shall wear monogoggles if they are even remotely within range of the activity.

Biology - Safety monogoggles shall be worn when any of the activities may involve possible explosion, spattering of potentially harmful chemicals, or flying particles.

Chemistry - During any laboratory activity potentially harmful to the eyes, monogoggles with hooded vents or face shield shall be worn by everyone in the room. Care in purchasing the goggles should be taken to select those which allow for the most unimpaired peripherial vision.

Physics - Safety eye spectacles with side shields or monogoggles shall be worn when any of the activities may involve possible explosions, spattering of potentially harmful chemicals, or flying particles.

All Other Science Laboratories - Monogoggles shall be worn while any acitivity which may constitute a danger to the eyes is in progress in the room.

For further information concerning science contact the
Science Consultant
State Department of Public Instruction
Topeka, Kansas
Telephone - CEntral 5-0011, extension 8194

ART

The school may wish to provide or require eye protection for students and teachers in their art department where similar hazards exist even though art was not specifically mentioned in Senate Bill #152.

For further information concerning art contact the
Art Consultant
State Department of Public Instruction
Topeka, Kansas
Telephone - CEntral 5-0011, extension 8194

VISITORS

All visitors in shops and laboratories shall wear visitor's goggles or spectacles with special side shields which must be provided in sufficient quantity by the school. The school shall provide sterilization for these devices between users.

VOCATIONAL-TECHNICAL EDUCATION

Drafting Technology, Technical Illustration, Commercial Art, Business and Office Education, Data Processing - Eye protection is not required when activity is done in a separate room. However, safety spectacles with side shields shall be required if activity is done within a shop area where any potentially dangerous activities are in progress.

Graphic Arts, Litho-Printing, Electricity, Electronics, Radio and TV Repair, Metalwork Technology, Carpentry, Plastics, Telephone Technology - Safety spectacles with side shields shall be worn while any activity which may constitute a danger to the eyes is in progress in the room.

Auto Mechanics Auto Body, Farm Mechanics, Auto Body, Farm Mechanics, Diesel Mechanics, Welding, Machine Shop - Spectacles with side shields shall be worn while any activity which may constitute a danger to the eyes is in progress in the room. In addition, welding goggles or a welding helmet shall be provided for proper protection in welding. A face shield or some other protective eye device is necessary for some specific grinding and machining operations. In electric arc welding, spectacles should have filtered lenses and the side shields of all spectacles in the welding shop must prevent the passage of harmful light rays from other welding operators while the helmet is in the raised position.

Food Preparation and Supervision, Heavy Equipment Operation, Agriculture Technology, Clothing Services, Cosmetology, Home Economics, Practical Nursing, Dental Assistant, and other related shop or laboratory type programs - Eye protection is not required but the school may wish to provide or require eye protection for students and instructors in their various departments.

For further information concerning Vocational Education contact the
Area Vocational Technical School Supervisor
State Board for Vocational Education
Topeka, Kansas
Telephone - CEntral 5-0011, extension 8121

SYNOPSIS OF THE UNITED STATES OF AMERICA STANDARDS INSTITUTE SAFETY CODE Z2.1-1959

GOGGLES

Goggles may provide eye protection from fine dusts, fumes, liquids, splashes, mists, sprays, flying objects, glare and radiation.

General requirements for goggles are that they shall consist of two eyecups with lenses and lens retainers connected by an adjustable bridge and the replaceable and adjustable headband or other means for retaining eyecups comfortably in front of the eyes. The materials used shall be made from a plastic or other material of such composition as to withstand the head deformation test, disinfection, water absorption and flammability tests.

The fit of the goggles shall permit an effective angle of vision not less than 105 degrees, assuming that the pupil of the eye is located 17mm behind the inner surface of the lens. The edge of the eyecup which bears across the face shall have a smooth surface, free from roughness or irregularities which might exert undue pressure or cause discomfort to the wearer. The depth will be sufficient so that the lenses will not interfer with the eyelashes of the wearer. The covercup type goggle shall be designed and will provide ample clearance and will not interfer with the ordinary corrective spectacles of the wearer.

Eyecups shall be ventilated to permit circulation of air. Ventilation openings shall be such as to exclude a spherical particle 0.04 inch in diameter. The ventilation openings shall be baffled or screened to prevent the direct passage of dust or liquids into interior of the eyecups.

Each eyecup shall be provided with a lens retainer bearing evenly on the lens with sufficient pressure effectively to retain fragments in the event of lens breakage, and the lens should not be inwardly dislodged from its seat upon impact. The frames shall bear a trademark identifying the manufacturer.

SPECTACLES

Spectacles may provide eye protection from flying objects, glare and injurious radiation. Spectacles shall consist of two lenses and two lens frames of suitable size and shape for the purpose intendedn, connected by a nose bridge and supported on the face by temples or other suitable means. The frame and side shields when provided shall be made of metal or slow burning plastic. Spectacles without side shields are intended to provide frontal eye protection only. The edge of the frame and side shield shall have a smooth finish free from irregularities which may cause discomfort to the wearer. The frames shall bear a trademark identifying the manufacturer.

LENSES

Plastic lenses used in flexible fitting goggles shall be not less than 0.05 inches in thickness. Materials used shall be capable of withstanding the disinfection, corrosion resistant, water absorption and flammability tests. If glass lenses are used, they shall be not less than 3mm nor more than 3.8mm in thickness.

Materials used in the manufacture of eye protectors shall combine mechanical strength and lightness of weight to a high degree, shall be non-irratating to the skin when subjected to perspiration, and shall withstand frequent disinfections. Where metals are used, they shall be inherently corrosion resistant.

The materials shall be such as to withstand, without visible deterioration or discoloration, washing in detergents and warm water, rinsing to remove all traces of detergent, and disinfection. All plastic parts shall be tested for water absorption. The amount of water absorption shall not exceed 5%.

The lenses shall be free from striae, bubbles, waves, and other visible defects and flaws which would impair the optical quality. The edges of the lenses shall be smooth and the required lenses shall be bevelled and the bevelled edges shall be dull finished. Lenses of all types shall exhibit not more than 6% haze.

Minimum thickness of prescription lenses shall be 3mm except in the case of lenses of strong plus power, when the edge thickness may be reduced to 2.5mm provided they meet the impact test. Clear lenses shall transmit not less than 89% of the incidental luminous radiation.

Each lens shall be marked in such a way that the manufacturer may be identified. Each filter lens shall be marked with a shade number.

Lenses of all types shall withstand the impact of a 7/8 inch steel ball dropped onto the horizontal outer surface of the lens from a heighth of 50 inches.

Plastic materials shall be slow burning. Flammability of the materials shall be no greater than that exhibited by cellulose acetate or acetate butyrate.

The above paragraphs have been an attempt to summarize statements in a rather lengthy code. If an actual code is desired, it is suggested you contact the United States of America Standards Institute, 10 East 40th Street, New York City, New York 10016, where a copy can be obtained for $3.50 plus 75¢ for handling. Correspondence should be directed to the Sales Department of the Institute.